



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/058,454	01/28/2002	Andreas Falk	40770-000127	4248
30593	7590	10/31/2005	EXAMINER	
HARNESS, DICKEY & PIERCE, P.L.C. P.O. BOX 8910 RESTON, VA 20195			LAXTON, GARY L	
			ART UNIT	PAPER NUMBER
			2838	

DATE MAILED: 10/31/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

AK

**Office Action Summary**

Application No.

10/058,454

Applicant(s)

FALK ET AL.

Examiner

Gary L. Laxton

Art Unit

2838

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 27 September 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1,2,4-17 and 19-23 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2,4-9,12,14-17 and 19-22 is/are rejected.
- 7) ☒ Claim(s) 10,11,13 and 23 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)             | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

## **DETAILED ACTION**

### ***Response to Arguments***

1. The finality of the previous Office action is hereby withdrawn.
2. Applicant's arguments with respect to claims 1, 2, 4-17 and 19-23 have been considered but are moot in view of the new ground(s) of rejection.

### ***Claim Objections***

3. Claims 6, 10 and 23 are objected to because of the following informalities:

Claim 6 recites the limitation "the half bridge" in line 4. There is insufficient antecedent basis for this limitation in the claim.

Claim 10 recites the limitation "the capacitor" in line 4. There is insufficient antecedent basis for this limitation in the claim. Does the applicant mean the capacitor array or the resonance capacitor?

Claim 23 recites nominal operation is 1/2/of no load; when claim 10, which claim 23 depends from, claimed nominal operation is 1/3 of no load; which one is it 1/3 or 1/2?

Appropriate correction is required.

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1, 4, 5, 7 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ostlund (Publication No. XP 000113877) in view of Klontz et al (US 5,341,083).

Ostlund discloses, in figure 8, a primary converter (HV1); a common transformer including a plurality of primary windings (H1/3) and a single secondary winding (N2); and a single secondary converter (4QC) connected to the single secondary winding, wherein the primary converter includes at least three primary converter sections (HV1) connected in series, wherein output lines of each of the at least three primary converter sections are connected to a respective one of the plurality of primary windings of the common transformer.

However, Ostlund does not disclose wherein each primary winding of the common transformer is allocated one resonance capacitor.

Klontz et al teach that resonant converter topologies are known in the art (i.e. allocating a resonance capacitor; see fig. 7 of Klontz et al). Additionally, Klontz et al further elaborate on the benefits of such converter topologies (i.e. allocating a resonance capacitor to a primary winding; see col. 9 lines 29-48).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the circuit of Ostlund to include resonance capacitors in each

Art Unit: 2838

of the primary windings in order to supply the volt-amperes-reactive requirements, so the inverter need only supply real power as needed by the system and also to allow switching at near zero voltage or near zero current crossing points, which results in significantly lower switching losses and the ability to obtain higher frequencies, as taught by Klontz et al.

6. Claim 17 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ostlund (Publication No. XP 000113877) and Klontz et al (US 5,341,083) in view of Nomura (US 6,388,904).

Ostlund and Klontz et al disclose the claimed subject matter as in regards to claim 1 supra, except for using a switch and filter to operate the AC mains.

Nomura teaches a filter 4, 5 and input switch 6 to operate the mains AC power to the converter circuits and isolate it from the rest of the circuit in case of overloading.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use a switch and filter to filter noise when in operation and to use the switch to isolate the circuit in overload situations.

7. Claims 1, 2, 4, 5, 7, 14, 15, 17, 20 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kunz et al (Publication No. XP-000877540) in view of Klontz et al (US 5,341,083).

Kunz et al disclose, in figure 2, a primary converter; a common transformer including a plurality of primary windings and a single secondary winding; and a single secondary converter connected to the single secondary winding, wherein the primary converter includes at least three

Art Unit: 2838

primary converter sections connected in series, wherein output lines of each of the at least three primary converter sections are connected to a respective one of the plurality of primary windings of the common transformer.

However, Kunz et al do not disclose wherein each primary winding of the common transformer is allocated one resonance capacitor.

Klontz et al teach that resonant converter topologies are known in the art (i.e. allocating a resonance capacitor; see fig. 7 of Klontz et al). Additionally, Klontz et al further elaborate on the benefits of such converter topologies (i.e. allocating a resonance capacitor to a primary winding; see col. 9 lines 29-48).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the circuit of Kunz et al to include resonance capacitors in each of the primary windings in order to supply the volt-amperes-reactive requirements, so the inverter need only supply real power as needed by the system and also to allow switching at near zero voltage or near zero current crossing points, which results in significantly lower switching losses and the ability to obtain higher frequencies, as taught by Klontz et al.

8. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kunz et al (Publication No. XP-000877540) and Klontz et al (US 5,341,083) in view of Chang et al (US 6,181,079).

Kunz et al and Klontz et al disclose the claimed subject matter as in regards to claim 4 supra, except for the resonance frequency being equal to the switching frequency of the half bridge.

Chang et al teach switching a half bridge inverter at the frequency of the resonance frequency of the circuit.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to switch a half bridge inverter at the frequency of the resonance frequency of the circuit in order to provide an efficient operating power supply circuit as taught by Chang et al.

9. Claims 8, 9, 12, 16, 19 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kunz et al (Publication No. XP-000877540) and Klontz et al (US 5,341,083) in view of Laeuffer (US 6,324,080).

Kunz et al and Klontz et al disclose the claimed subject matter as in regards to claim 4 supra, except for a capacitor array and an additional inductor coil.

Laeuffer teaches utilizing a capacitor array (C1 and C2) having a symmetrical magnetic and electric structure for lossless switching connected to a half bridge circuit in known fashion (col. 2 lines 4-10) for providing a half bridge resonant converting apparatus with circuit phase and time variables.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Reinhold et al with the teachings of Laeuffer in order to provide a half bridge resonant converting apparatus with circuit phase and time variables coupled to a capacitor array and to decouple the converter sections of

***Allowable Subject Matter***

10. Claims 10 and 23 would be allowable if rewritten to overcome the objection(s) set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

11. Claims 11 and 13 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

12. The following is a statement of reasons for the indication of allowable subject matter:

Claims 11 and 13 are considered as having allowable subject matter as stated in the previous office action dated 3/13/03.

Claims 10 and 23; prior art fails to disclose or suggest, inter alia, an electronic circuit comprising the limitations of claims 1, 4 and 8; and further comprising wherein a resonance frequency, a ratio of impedances of the leakage inductance coil to the capacitor array is chosen so that an effective value of an alternating voltage of the capacitor in nominal operation is at least 1/3 of a no-load voltage of a transformer of a primary winding.



***Conclusion***

13. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Art Unit: 2838

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gary L. Laxton whose telephone number is (571) 272-2079. The examiner can normally be reached on Monday thru Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Sherry can be reached on (571) 272-2084. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in dark ink, appearing to read 'Gary L. Laxton', is positioned above the printed name.

Gary L. Laxton  
Primary Examiner  
Art Unit 2838

10/27/2005